

Exploring Adaptive Learning of English as a Foreign Language from the Perspective of Semiotics

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Abstract. Both adaptive learning and semiotics play crucial roles in learning English as a foreign language. This paper reviews adaptive learning and semiotics, respectively, by analyzing the technical support and function of adaptive learning, as well as the concept of semiotics. Then, this paper further explores the relationship between the two, finding out that adaptive learning is an embodiment of semiotics, and semiotics is a mediator in adaptive learning. Among a number of applications of adaptive learning, the author chooses one of the representative applications and analyzes its strengths and weaknesses. Since there are scant articles that cover adaptive learning and semiotics and focus on learning English as a foreign language at the same time, this paper aims to demonstrate the significance of linking the two aspects with foreign language learning and provide practical pedagogical implications to language teachers.

1. Introduction

In education, it has been witnessed a prevailing trend of adaptive learning [1-2]. Meanwhile, semiotics, as an active part of multidisciplinary integration including education, powerfully covers a framework in foreign language teaching and learning. This review paper is to explore adaptive learning of English as a foreign language from the perspective of semiotics. In the era of artificial intelligence, the concept of adaptive learning is still vague. Therefore, the first part is to clarify the terminology, figuring out what is adaptive learning and semiotics and what is their function respectively. Since adaptive learning and semiotics share certain commonalities, the second part is to investigate the relationship between them. This part is reviewed from two dimensions: for semiotics, adaptive learning is its embodiment; in adaptive learning, semiotics acts as a mediator. Different adaptive learning platforms are currently being introduced to offer individualized education to fit the needs of students learning English as a foreign language. In the third part, the author takes one of the platforms applied in adaptive learning of English as an ex-

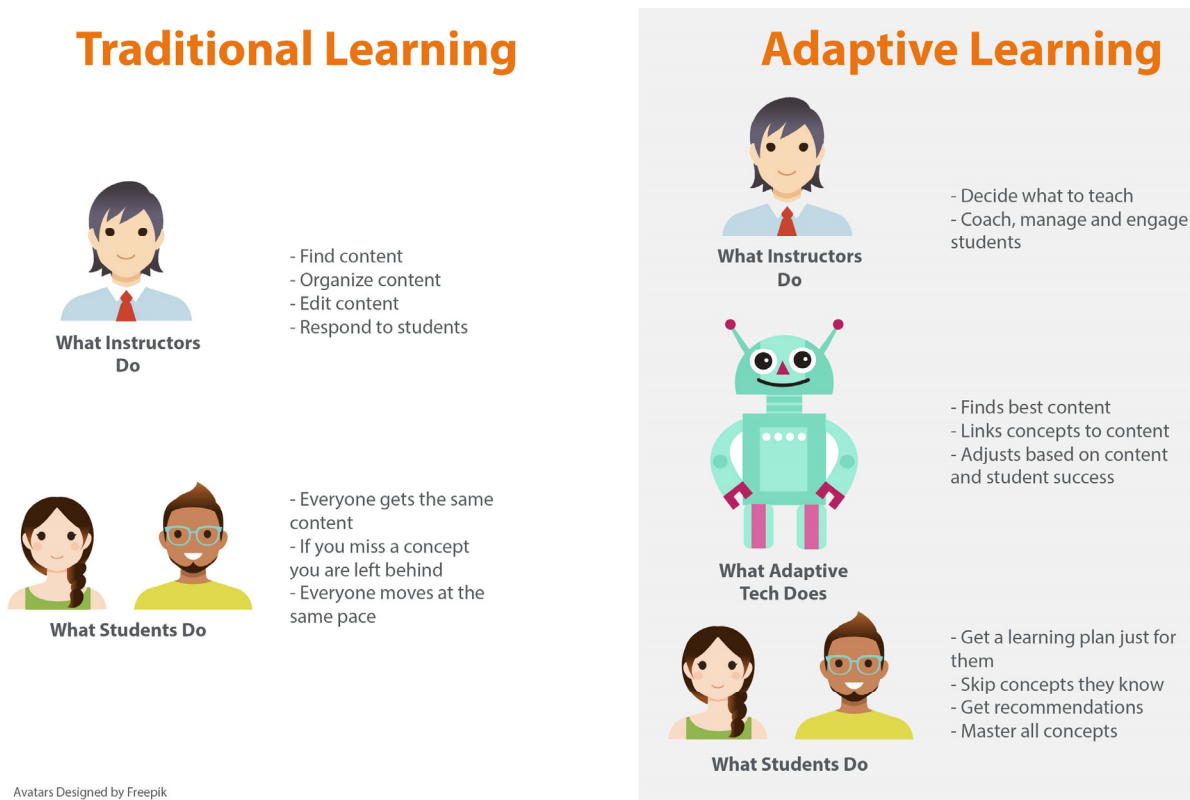
ample, analyzing the strengths by comparing it with traditional learning patterns and the weaknesses in terms of oral English practice.

2. Adaptive Learning and Semiotics

2.1. Adaptive Learning

Adaptive learning is defined by The Horizon Report in 2018 that it works when individual learning paths are created for students by using digital systems and tools based on their shortcomings, strengths, and learning pace [1]. Figure 1 shows the comparison of the traditional learning and adaptive learning. It is a personalized learning method, which provides educational support based on the specific learner's psychological characteristics, knowledge status, learning behavior, etc. The adaptive learning system can first realize adaptive testing on the learner to analyze and evaluate dynamically. Then it updates the learner model with the results and selects subsequent appropriate learning tasks, resources, and styles. Eventually, it provides personalized learning planning guidance and forewarning signals. All of these three processes are connected with each other.

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Figure 1. Comparison of the traditional learning and adaptive learning

Among adaptive learning, technology is the driving force for educational change or even reform. The degree of intellectualization determines the depth of adaptive learning. With the development of big data and artificial intelligence technology, the research and application of adaptive learning have been upsurging [2-4]. The computer has shifted from just delivering course content to learners as a conduit to a system that provides continuous identification of the learning needs of each learner and individualized learning paths at any one time [1]. Compared with the traditional role that plays in learning, the computer in adaptive learning involves more models, student model, domain model, pedagogical model, and interface model. In addition, the cooperation of different algorithms also plays a key role in adaptive learning. Among these algorithms, the genetic algorithm is one of the core algorithms used in adaptive learning. Without this algorithm featured with its parallelism and global optimization capability, the learning recommendation and resources provided by the adaptive learning system may not be the most suitable for the learner. Consequently, the learning outcomes of students will be unsatisfactory.

To some degree, adaptive learning functions as the motivation in language learning. Woodrow proposes that adaptive learning is composed of constructs of motivation in language learning that play a crucial role in successful language performance [5]. Although language learning anxiety has been regarded to impede the process of language learning and even performance, especially when a certain language as a foreign language is learned, adaptive learning can help effectively diminish the anxiety

by adjusting the way in which the target language and corresponding culture are presented and taught.

The learner model plays an important role in the adaptive learning system. According to Nguyen, adaption is decomposed into two forms, adaptive presentation, and adaptive navigation [6]. The former means the information which is shown to the learner, and the latter refers to the process of planning the learning path in a dynamic environment. With the help of the establishment of the open and flexible learner model, adaptive learning can be realized in different domains and different contents through hypermedia in accordance with the learner's individual needs. This new method may emancipate the learner from an ill-suited one. The following comprehensive and balanced curriculum as well as learner-oriented pedagogics may serve as a motivation to arouse interest and enhance the efficiency of learning.

2.2. Semiotics

The concept of semiotics has evolved over history [7-8]. Originally, the concept of semiotics stems from that of the sign, and the variants of semiotics are derived from the ancient Greek word *semeion* and Latin word *signum*, both of which mean sign. Hence, unfortunately, semiotics once only referred to the study of signs in general. One of the founders of modern semiotics is Peirce, who emphasizes the universality of semiosis and utilizes a triadic conception to further definite the sign. On the other hand, Swiss linguist Ferdinand de Saussure proposed a primarily dyadic, and then unquantifiable conception of the sign based on linguistics [7]. He deemed that a sign or a linguistic unit

consists of two parts, signifier and signified [7]. Even though there is signification, the connection between any specific signifier and its signified, the two do not have an intrinsic connection and their relationship is arbitrary.

Due to the limitation of that conception of semiotics, Halliday adds that semiotics is the study of the sign system and most generally speaking, the study of meaning. Therefore, linguistics, as one of the branches of semiotics, is the source and potential of meaning [8]. This definition considers signs as a set of relationships existing in a system. They are correlated with each other and even other social elements. Otherwise, there will be no inter-disciplines, such as cognitive semiotics, media semiotics, musical semiotics, and communication semiotics. Since the emergence of semiotics, it has cooperated with other disciplines and many new academic fields have been created with its distinctive features. It can be compared to the common denominator of humanities and social sciences.

As semiotics is striding toward multidisciplinary integration including education, it can also be conducive to foreign language teaching and learning. The relationship between various aspects of foreign language teaching and semiotics has been explored. As Wang and Yin point out, from the semiotic perspective, education is the symbolization of human beings, the cognition, understanding, mastery, and creation of signs [9]. This process is imperative for foreign language learning because a kind of foreign language is the product of a certain foreign culture, regulated and conditioned to varying degrees by social norms and social semiotics. However, semiotics in foreign language learning not only provides practical pedagogical implications for teaching, but also cultivates global culture consciousness and intercultural communication competence.

3. The Relationship Between Adaptive Learning of English as a Foreign Language and Semiotics

There are some interrelated aspects between adaptive learning and semiotics. Learning and adaptation are regarded as indispensable parts of semiotic modeling [10]. Even though there are some differences between adaptive learning and semiotics, they complement each other for making progress in foreign language learning and teaching.

3.1. Adaptive Learning as Semiotically Embodied

Adaptive learning is an embodiment of semiotics. Danesi explains that semiotic competence is the ability to connect the grammar and vocabulary that reflects concepts on the surface with the underlying structure [11]. This perspective on competence is more learner-centered, rather than language-centered or sign-centered. The learning autonomy and engagement are of a higher degree, indicating a wider choice scope and higher freedom degree in utilizing signs. To some degree, the principle and mechanism of

adaptive learning are consistent with semiotics, as it also aims to set up a learner-centered environment.

3.2. Semiotics as a Mediator in Adaptive Learning

Semiotics has interacted with education continuously after its emergence. Nöth claims that semiotics is related to education in two aspects [12]. From one point of view, there are semiotic implications of learning and teaching as both are semiosis processes. From the other perspective, the study of learning and teaching processes is part of and conducive to the study of the ontogeny of communication and signs, a branch of semiotics [12]. The overlap of these two disciplines also illustrates the mediating role that semiotics plays in adaptive learning. As a base for inter-disciplines with aspects to be covered in various academic discourses, semiotics paves the way for adaptive learning of foreign languages. Semiotic elements are consciously applied in adaptive testing, diagnosis, and recommendation to break down the barrier across different disciplines.

On the other hand, semiotics serves as a mediator in adaptive learning, as the cognitive dynamics of semiotics benefit the learning pattern. In essence, semiosis is a process of dynamic cognition and communication [6]. As a kind of communication that mainly focuses on linguistic signs, foreign language learning involves high interactivity and variability. In the process, the encoding and decoding of the sign are real-time and continuous. In adaptive learning of foreign languages, the state of learners is constantly changing. In other words, the learning process data is dynamic, so the learner model also needs to be adjusted and updated by the algorithm. With the cooperation of semiotics, the system accelerates the tracking rate, improving the efficiency and effectiveness of adaptive learning.

4. The Application of Adaptive Learning

Currently, various adaptive learning platforms are launched to provide customized instruction to meet the learner's needs in learning English as a foreign language [2-4]. For instance, LAIX (i.e., Liulishuo in Chinese) is an online English learning platform. As its name suggests, driven by artificial intelligence, it can lead to a new way of learning and there are infinite possibilities in this educational project as X. This adaptive learning platform is committed to providing personalized guidance in English learning. In terms of oral English learning, by capturing the changes in the user's mouth shape, the computer can find out the weaknesses and strengths of his or her pronunciation and help to solve the problems through targeted suggestions. Compared with the traditional classroom, in which students have less access to instant feedback from their teacher, this platform can not only correct the user's errors based on the user's mouth movement but also function to complement the former.

However, there are also some limitations of this platform in adaptive learning. First, the artificial intelligence applied to this platform is too rigid and too narrow to correspond to the dynamics of the cognitive

content. Although its feedback is relatively accurate and timely, perhaps due to the fact that the application is targeted at learners of different English proficiency levels, apart from the part of man-machine instant communication, the content of the rest of the oral English practice is specified by the system. This drawback induces the speech interaction and freedom in the learning process to be restricted to a certain communication extent recommended by the adaptive learning system. Besides, the accent of the user is hard to be recognized only by testing the movement of the user's mouth. In terms of oral practice, the platform needs to be refined with more contexts to meet the semiotic needs and algorithms which can further analyze the different aspects of pronunciation and correct the mispronunciation comprehensively.

5. Conclusion

In this paper, the terminology of and relationship between adaptive learning and semiotics have been reviewed. Adaptive learning is an innovative personalized learning approach, supported by artificial intelligence and algorithm, in which the learner model plays a key role. The definition of semiotics is gradually refined, referring to the study of the sign system and, in general, of meaning. Both of them play a key role in learning English as a foreign language. The former performs as an impetus, and the latter provides important implications in education. The relationship between them is that adaptive learning is semiotically embodied and semiotics functions as a mediator in adaptive learning. The analysis of an adaptive learning application also reveals the capability and limitations of adaptive learning of English as a foreign language. In the future, while unleashing great potential, the adaptive learning of English as a foreign language will face some challenges. As the analysis of the learning process by technology is still on the surface, many adaptive learning applications are limited to test, navigation, and recommendation rather than grasping the intrinsic factors of learning. But once the drawbacks are overcome, adaptive learning will better cooperate with semiotics and play a greater role in learning English as a foreign language.

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